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Evolution of a Petroleum Play in the Falkland Islands

Six wells, drilled in the North Falkland Island Basin, encountered source rocks, reservoir rocks and seals. Although these wells were non-commercial, several wells encountered both oil and gas shows, supporting the presence of an active petroleum system in the basin. The main reservoir objectives at the time of drilling were thought to be within the Lower Cretaceous prograding deltaic sequence. This sequence lies above a thick (88m to 584m) basinwide, Barremian to Valanginian type I lacustrine source rock/seal with TOC values of 2 to 10 %. More importantly, older Valanginian-Tithonian organic rich type I & II source rocks with TOC's of 2 to 7% were encountered within the early rift sequence. Basin modeling suggests that up to 76 billion barrels of oil have been generated and expelled, most of it coming from the older Valanginian to Tithonian shales. Because the wells were drilled where the source rocks were immature, the Barremian-Valanginian lacustrine shales acted as a vertical seal, preventing migration from the deeper mature source rocks into the main pre-drilling deltaic reservoir objectives. Large hydrocarbons potential exists within the graben in the fluvial and shoreline sandstones below the regional lacustrine seal.